

REMARKS

Claims 11-16 and 18-26 are pending in this application. Claims 11-16 and 18-21 are rejected under 35 USC 112, second paragraph. Claims 11-15, 18-21 and 25 are rejected under 35 USC 103(a) as being unpatentable over Kurz in view of Kear. Claims 16 and 26 are rejected under 35 USC 103(a) as being unpatentable over Kurz in view of Kear and further in view of Caballero. Claims 22-24 are rejected as being unpatentable under 35 USC 103(a) over Esch in view of Kear.

Claims 11 and 25 are amended herein. Support for these amendments can be found in the substitute specification at paragraphs 0038 and 0039.

Rejections under 35 USC 112:

Independent claim 11 has been amended herein to eliminate the indefinite term "undesirable" and to replace it with the term "structure defect." Structure defect is a term that is well understood in the art, and one example of a structure defect is discussed in paragraph 0038 as being globular grains. Accordingly, this rejection has been overcome.

Rejection of claims 11-15, 18-21 and 25 over Kurz in view of Kear:

Kurz teaches the deposition of a plurality of layers of material, where each layer assumes the monocrystalline structure of the underlying material. The Examiner admits that Kurz fails to teach any layer being non-single crystal or non-directionally grown structure, and then applies Kear to remedy this deficiency. Kear teaches a diffusion bonding interlayer that includes an amorphous metal structure. Thus, the Examiner finds that it would have been obvious to modify the process of Kurz by providing one of the layers to be the non single-crystal or non-directional structure intermediate layer as suggested by Kear.

However, the Examiner errs in concluding that this intermediate layer "isolates the single crystal build up layer from the crystal orientation of the substrate." In fact, both Kurz and Kear specifically teach processes that preserve the underlying crystal structure into the added layer. See in particular, Kurz column 2, lines 9-11 which teaches "The method is an epitaxial procedure in which the crystalline structure of the substrate is adopted by the layer or layers which are built up." and Kear column 9, lines 44-48 which teaches "The phenomena in the joint

region are such that the interdiffused interlayer will solidify epitaxially from the faying surfaces of the workpieces, which of course typically have crystalline metal structures." Thus, when the amorphous interlayer of Kear is introduced in place of one of the layers of Kurz, any structure defect of the underlying layer will be continued through the interlayer as it solidifies during the diffusion joining process.

In contrast, each of the rejected claims 11-15, 18-21 and 25 have been amended to include limitations that are directed to preventing the crystal structure of the substrate from being duplicated into the added layers, and in particular, to preventing a structure defect of the substrate from being copied into the added layers. For example, independent claim 11 includes the limitation of "epitaxially growing a single crystal buildup layer material on the intermediate layer, the single crystal buildup layer being isolated from the at least one structure defect of the substrate by the intermediate layer." Independent claim 25 includes the limitations of "wherein the intermediate layer is applied by a second material application process different than the first material application process such that the structure defect at the surface of the substrate is not copied into the intermediate layer; wherein the overlayer is epitaxially grown on the intermediate layer without the structure defect." Accordingly, the combination of Kurz and Kear fails to provide *prima facie* support for a rejection of amended claims 11-15, 18-21 and 25 under 35 USC 103 since each of these claims includes limitations not taught by the combination.

Rejection of claims 16 and 26 over Kurz in view of Kear and further in view of Caballero:

Dependent claims 16 and 26 are all now allowable for at least the reasons present with regard to their respective base independent claims 11 and 25 presented above. The addition of the teaching of Caballero fails to rectify the deficiencies of the combination of Kurz and Kear, and therefore, no *prima facie* case for obviousness has been established for claims 16 and 26.

Rejection of claims 22-24 as being unpatentable over Esch in view of Kear:

The Examiner states at the bottom of page 10 and continuing onto page 11 of the final rejection that "Esch et al. (361) teach a component comprising a vane (4) as a substrate having a single-crystalline structure..." This is incorrect, since the vane (4) substrate of Esch is actually the equiaxed cast or wrought alloy, not the single crystal material. Thus, the whole premise of the Examiner's position is in error. Esch teaches simply an amorphous cast or wrought alloy (4)

joined by a weld or braze (7) to a single crystal material (3). This structure teaches away from the structure of claims 22-24 which requires two single crystal materials joined by an intermediate layer. The Examiner then states on page 12 of the final rejection that "It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to modify the component of Esch et al (361) by providing a non single-crystalline or non-directional structure intermediate layer for the joined work-pieces...as suggested by Kear et al ('229)." However, the structure that would result from the Examiner's proposed combination would be an amorphous cast or wrought alloy (4) joined by an intermediate layer (Kear) to a single crystal material (3). Thus, the combination of Esch and Kear fails to establish a *prima-facie* case for the obviousness of claims 22-24 and the rejection of claims 22-24 should be withdrawn.

Conclusion

The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, including the fees specified in 37 C.F.R. §§ 1.16 (c), 1.17(a)(1) and 1.20(d), or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

Dated: 10/9/08

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